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ABSTRACT

Mobile computing and assured access are becoming popular terms to describe a growing number of university programs which take advantage of ubiquitous network access points and the portability of notebook computers to ensure all students have access to digital tools and resources. However, the implementation of such programs varies widely from campus to campus. This paper brings together representatives from five campuses, the University of Hong Kong, the National University of Singapore, and three United States institutions--Seton Hall University, Sonoma State University, and Wake Forest University--to describe and discuss how each is providing notebook computers and assured access to network resources to all students. (Author)

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Assured Access/Mobile Computing Initiatives on Five University Campuses

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Overview of Panel Topic

"Mobile computing" and "assured access" are becoming popular phrases to describe a growing number of university programmes which take advantage of ubiquitous network access points and the portability of notebook computers to ensure all students have access to digital tools and resources. However, the implementation of such programmes vary widely from campus to campus. This session will bring together representatives from five campuses, the University of Hong Kong, the National University of Singapore, and three U.S. institutions - Seton Hall University, Sonoma State University, and Wake Forest University - to describe and discuss how each is providing notebook computers and assured access to network resources to all students.

Mobile Computing and Students at the University of Hong Kong-A Good Match

Craig Blurton, University of Hong Kong

Responding to developments in learning technologies, tertiary institutions around the world are exploring new methods of teaching and learning, developing new programme delivery mechanisms, and addressing the educational needs of new types of students. John F. Kennedy, an American president, once noted:

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"Change is the law of life, and those who look only to the past or the present are certain to miss the future." In a time of diminishing resources and increasing competition for students, universities can ill afford to ignore future directions of IT use in education.

The University of Hong Kong has made a firm commitment to be a leader in the use of information technology in education. It is the University's intent to move ahead rapidly to create a technology-rich environment in which teaching, learning and research can thrive, and our students and staff can make effective use of the latest advances in IT.

Our main strategy in this regard is the creation of a mobile computing environment on campus in which a new "digital culture" can be fostered. Beginning September 1998, all incoming freshman are encouraged and subsidized to own a notebook computer. In the first class under the new programme, approximately 2,600 students (86%) chose to participate.

To provide network access, over 10,000 access points are being installed across campus, off-campus dial-in access is being significantly upgraded, and the University is experimenting with wireless networking technologies. By the year 2001, in is envisaged that a technology-rich teaching and learning environment will have been created at HKU. By that time, all HKU students may own a notebook computer with which they will be able to access networked tools and resources from anywhere at anytime, both on and off campus.

To achieve these goals, HKU invited creative partnership proposals from corporations interested in working towards a common vision of using information technologies to improve educational opportunities for students. We sought an innovation, visionary corporate partner who would not only offer us deeply discounted hardware for students and staff, but also invest in collaborative research and development efforts. After an exhausting process, the IBM Corporation was selected.

While creating a "mobile computing environment" at the University, we are also engaging in reform efforts to make better use of IT in:

* Curriculum,
* Teaching & Learning Methodologies,
* Educational Resource Development & Access, Academic Staff Development,
* Infrastructure,
* Technical support,
* Information Services,
* Financial Planning, and
* Administrative Processes.

These reforms will enable all students and staff at the University to take full advantage of access to notebook computers, networks, and networked information.

The Global Campus Project at the National University of Singapore

Yam San Chee, National University of Singapore

Several years ago, the National University of Singapore framed an IT Strategic Plan to lay the foundation for the pervasive use of IT on campus: in teaching, learning, research, and adminstration. In operationalizing this plan, an extensive IT infrastructure has been set up, embracing the following elements: campus-wide networking, global networking, client-server based integrated information systems, smart card based insfrastructure, remote lecturing and computing, high performance computing, online transactions, library based information systems, and video-based services. These developments have taken place against the backdrop of Singapore ONE, the nation's high-speed, ATM-based broadband network, and collectively constitute the Global Campus Project.

The University has set up a secure plug and play network system with some 10,000 connection points installed across the campus. In the academic year commencing July 1998, freshmen in selected faculties were strongly encouraged to make use of notebook computers for their studies, for communicating with faculty, as well as for the conduct of administrative tasks (eg. course registration). In addition, a campus-wide Integrated Virtual Learning Environment (IVLE) has been set up. It provides a one-stop interface for faculty and students from which to access relevant resources and perform tasks. For example, faculty are able to make use of an electronic form to set up their course web pages while students can participate in both asynchronous course discussion as well as real-time, Web-based chat.

In early 1999, the University established the Centre for Instructional Technology. The Centre has the mission of intensifying the use of IT in both teaching and learning on campus. In addition to the IVLE service mentioned previously, the new Centre now also supports courseware development, multimedia conferencing, multimedia production, Webcast of lectures, and provides a student assistant plan to assist faculty in the production of courseware. The establishemnt of the Centre reflects the University's strong commitment to the creation of an IT-pervasive global learning environment on campus.

Implementing and Assessing Mobile Computing at Seton Hall University

Phillip D. Long, Seton Hall University

A Revolution Going On:

"There is a revolution going on at Seton Hall University because there is a revolution going on in society. Information technology is a means for us to achieve our mission to prepare future leaders in a global society. Seton Hall University's Information Technology Long Range Plan represents our commitment to the use of information technology to achieve our mission and goals." Msgr. Robert T. Sheeran, President, Seton Hall University

Equity and Access:

To take advantage of this transformation to an information culture people must be information literate: that is, they must be able to locate, assess, analyze, and effectively communicate information. As a nation, we cannot afford to have a portion of our citizenry that is left behind in this transition. As a Catholic institution of higher education, Seton Hall believes that learning is both a private good and a public responsibility. The University must therefore equip all its students to take full advantage of the opportunities afforded by an information society.

Implementing this a program to create an information culture within the University provides guarantees. Faculty can reasonably expect that students assigned work that requires technology will have access to it, and be equipped to perform the work required. We are less concerned with distance learning, and more concerned with 'connected learning.' That is, while recognizing the convenience that is afforded by online access to instructional material, Seton Hall has concentrated on what elements of technology enhanced instruction best integrate with traditional liberal arts education that emphasizes small classes and inter-personal communication.

Piloting the Process:

Seton Hall piloted the laptop distribution program for three years, starting with 27 students in an initial mobile computing cohort. This year 1366 laptops were distributed in two days to our first fully enabled freshman class. Piloting the process enabled us to examine:

* Faculty support and training
* Curriculum revision strategies
* Asset management and distribution
* Software distribution

* Technical support
* Assessment practices and strategies

The Support Service Crisis and a Response:

Support for a large-scale technology deployment takes what already is a support service crisis and raises the specter of creating a support service catastrophe. While increasing IT staff is an unavoidable component, no higher education institution can hope to neither hire enough nor pay enough to keep sufficient numbers of IT professional staff. Rather, Seton Hall has pursued an approach, which brings the students forward as partners in the information technology support solution. The Student Technology Assistant Program teaches students to participate with technologists and faculty in supporting the community technology needs. In addition to the more traditional peer support, training and technical repair responsibilities, students directly with faculty in curriculum revision teams. Their role is mediated through a contract with the faculty establishing an intellectual barter - technical expertise of the student in exchange for mentorship and faculty disciplinary guidance. The overall enterprise is designed to be student run and student led. It addresses one of the most common oversights in student technology support programs by building in leadership and supervision redundantly across the program, at all levels. This project has become a national initiative of the AAHE/TLT Group and led to the designation of Seton Hall University as a TLT Group Leadership Center. Currently seventeen campuses in three countries are actively developing Student Technology Assistant Programs to address their local support service crises.

Knowing Where You've Been, Influencing Where You're Going:

Since the first laptops were distributed to students and faculty getting a handle on the student learning experience and the faculty teaching experience has been an on-going initiative. Through collaboration with the Flashlight Project (AAHE/TLT Group) and local development, an assessment process focusing on the institutional level has resulted in a set of survey instruments, focus group protocols and journaling guidelines that provide a consistent 'wide and shallow' indication of the impact of Mobile Computing on teaching and learning at Seton Hall. The value of this approach has led to the creation of the Institute for Technology Assessment to make these tools more widely available to interested institutions of higher education. In return, the Institute seeks to collaborate with participating institutions to incorporate their data into a longitudinal data repository to build an increasingly valuable community resource assessing the impact technology intensive deployments have on teaching and learning.

Seton Hall is committed to higher education instilling in our graduates an ethic for community service and leadership in the global affairs. Technology plays a central role in the liberal arts, in our community of scholarship, and in seeking the to reinforce the connectedness that otherwise tends to dissipate in information rich, values poor environments.

Implementing Assured Access/Mobile Computing at Sonoma State University

Mark Resmer, Sonoma State University

Recognizing that without a universal access policy, we risked creating a society of information haves and have-nots among our students. In Fall 1995, Sonoma State University became one of the first two public universities in the country to require that all incoming freshmen should have access to a networked personal computer. This year, the requirement was extended to include incoming Junior transfer students. By Fall 1998, all undergraduate students will be subject to the requirement.

Why do we need assured access to computers?

The driving force behind our Assured Access strategy is to make it possible for anyone to learn, any time, any place. In doing so, we are reflecting the following factors:

* The growing amount and changing nature of knowledge

* Changes in educational paradigms
* The need for improved communications
* Workplace demands
* Legislative requirements
* A need for equity
* Technological change and obsolescence

Implementing the requirement did not relieve the university of all responsibility for information technology access. To the contrary, assured access is a partnership, wherein the student provides basic access, while the campus provides not only infrastructure support, but also specialized labs with high-end machines for applications beyond the capacity of student owned machines.

From a business perspective, we treat student computers just like textbooks. Unlike other universities, we do not require students to purchase a notebook computer from a specific vendor. The institution makes a recommendation, but it is up to the student to make the business decisions associated with the purchase, i.e. exactly what to obtain, where to buy it, and indeed whether to buy it. Just as with textbooks, we recognize that while instructors can expect that students will have access to the required computer, there is no enforcement associated with the recommendation. Sonoma has no "computer police"!

Our students can:

- Purchase the computer outright: Vendors have offered computers at specially discounted prices, and the campus bookstore has limited its profit margins on computer sales.
- Obtain a loan, and use it to purchase a computer: A local credit union offers loan programs that are tailored to student needs.
- Use financial aid: Financial aid facilitates the purchase of computers by a significant number of students.
- Borrow a computer from a loan pool: Students who cannot afford any of the options above are offered a yearlong loan of a computer from a pool of machines maintained for this purpose. To date, 180 computers have been loaned to the most needy students.

Our universal access program has elicited an extraordinary degree of enthusiasm and support from both employers and the media, based on the perception that it is highly relevant to the needs of our "customers" - both the students, and society at large. Indeed, in the business community, the program is seen as a move by the university away from the isolationism of the "ivory tower" towards recognition of the real needs of the outside world.

Motivating and Facilitating Learning with IT at Wake Forest University

Craig Runde, Wake Forest University

The special challenge for a college or a university is to create an environment with the people, policies, and traditions that motivate and facilitate learning. In 1993, faculty, students and administrators of Wake Forest University began work on a blueprint to enrich the quality of undergraduate education at the institution, already nationally recognized as one of the finest private liberal arts universities in the country.

Wake Forest University decided to create a ubiquitous computing environment where students, faculty, and staff members all had laptop computers and network access from on campus and remote access to the campus network available via the IBM Global Network.

The University sought to use technology to provide a more customized learning experience for students. This approach built on strength of providing an education that is both personal and individual. Before the computer revolution, the way to personalize and customize education was to focus vast quantities of faculty time upon teaching and students. Although faculty time and attention is still the key to personalization, a student's education can now be customized through computer access.

If Wake Forest is to maintain its comparative advantage in both personal and individual education, it must strengthen its means to personalize (which means more faculty) and strengthen its capacity to customize (which means more computers). The Plan for the Class of 2000 incorporates both elements.

Professors, staff and students starting with the class of 2000 receive IBM ThinkPad computers which are refreshed every two years. Software includes the Windows 95 operating system, the Netscape Navigator Internet browser, Microsoft Office (Word, Excel, and PowerPoint) for word processing, financial analysis, and presentations.

Virtually all Wake Forest offices, residence hall rooms, and classroom seats are directly linked to the campus Ethernet network, which is based on IBM RS/6000 SP* servers and ATM switches. Special laboratories have been equipped for Music, Writing, Business, Physics, Chemistry, the Languages, and elsewhere.

A number of programs have been added to help both faculty and students effectively use the new technology. These have included a Computer Enhanced Learning Initiative for faculty that provides speakers, release time and training on how to incorporate technology in teaching and learning. It also includes the Student Technology Advisors programs where faculty and students are paired on course related technology projects.